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LC546)

G A S E S

Publications by the Staff of the National Bureau of Standards.

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Under each of the above classifications, the papers are grouped in the following order: Research Papers, Scientific Papers, Technologic Papers, Circulars, Miscellaneous Publications, Publications in Other Journals.

GENERAL INFORMATION

This Letter Circular is a selected list of papers relating to gases. Some of these have been published in the regular series of publications of the Bureau and others in various scientific and technical journals.

Unless specifically stated, the papers herein listed are not obtainable from the National Bureau of Standards. Those marked "OP" are out of print, but, in general, may be consulted at the libraries in large cities.

Where the price of a publication is given, it can be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The prices quoted are for delivery to addresses in the United States and its territories and possessions and in certain foreign countries that extend the franking privilege. When remitting for delivery to other countries, one-third of the total cost of publications should be added to cover postage.

Remittances should be made either by coupons (obtainable from the Superintendent of Documents in sets of 20 for \$1.00 and good until used), or by check or money order payable to the "Superintendent of Documents, Government Printing Office" and sent to him with order. (Please do not send stamps.)

Serial letters are used to designate publications of the National Bureau of Standards.

- RP = "Research Paper." These are reprints of articles appearing in the "Bureau of Standards Journal of Research" (BS J. Research) and the "Journal of Research of the National Bureau of Standards" (J. Research BS), the latter being the title of this periodical since July 1934 (volume 13, number 1).
- S = "Scientific Paper" of the National Bureau of Standards. This series was superseded by the "Journal of Research" in 1928.
- T = "Technologic Paper" of the National Bureau of Standards. T1 to T202 were issued each independent of the other with individual pagination. Later they were assembled to make the first 15 volumes of this series, and subsequent separates were given volume pagination (Tech. Papers BS). This series has also been superseded by the Journal of Research.
- C = "Circular" of the National Bureau of Standards.
- M = "Miscellaneous Publication" of the National Bureau of Standards.

For papers in other scientific or technical journals, the name of the journal is given in abbreviated form, with address in parentheses, and with the volume number, page, and year of publication, in the order named. Where indicated, reprints of the published articles are available from the National Bureau of Standards. Otherwise, the journals may be obtained from the publisher or consulted in libraries.

I. CHEMICAL AND PHYSICAL PROPERTIES OF GASES  
(Apparatus, Methods, Measurement and  
Theoretical Considerations)

For calorimetry and subjects dealing with utilization of  
fuel gases, see "Utilization of Fuel Gases." See also  
"Gas Analysis" and "Permeability."

<u>Title</u>	<u>Series</u>	<u>Price</u>
<u>Research Papers</u>		
Heat of formation of sulphur dioxide. J.R.Eckman and F.D.Rossini. BS J. Research <u>3</u> , 597 (1929).	RP111	OP
Heats of combustion of methane and carbon monoxide. F.D.Rossini. BS J. Research <u>6</u> , 37 (1931).....	RP260	OP
Heat of formation of water and heats of combustion of methane and carbon monoxide: A correction. F.D.Rossini. BS J. Research <u>7</u> , 329 (1931).....	RP343	OP
Calorimetric method for determining intrinsic energy of gas as a function of pressure. E.W.Washburn. BS J. Research <u>9</u> , 521 (1932)....	RP487	5¢
Heat of formation of hydrogen chloride and some related thermodynamic data. F.D.Rossini. BS J. Research <u>9</u> , 679 (1932) .....	RP499	5¢
Calorimetric determination of intrinsic energy of gases as a function of pressure. F.D.Rossini. BS J. Research <u>9</u> , 733 (1932).....	RP503	5¢
Pressure of saturated water vapor in range 100° to 374° C. N.S.Osborne, H.F.Stimson, E.F.Flock, and D.C.Ginnings. BS J. Research <u>10</u> , 155 (1933) ..	RP523	10¢
The vapor pressure of liquid and solid carbon dioxide. C.H.Meyers and M.S.Van Dusen. BS J. Research <u>10</u> , 381 (1933).....	RP538	5¢
Formula for specific volumes of saturated vapors. C.H.Meyers. BS J. Research <u>11</u> , 691 (1933).....	RP616	5¢
A critical test for the purity of gases. Martin Shepherd. BS J. Research <u>12</u> , 184 (1934).....	RP643	5¢
Calorimetric determination of the heats of com- bustion of ethane, propane, normal butane, and normal pentane. F.D.Rossini. BS J. Research <u>12</u> , 735 (1934).....	RP686	OP

<u>Title</u>	<u>Series</u>	<u>Price</u>
A formula and tables for the pressure of saturated water vapor in the range 0 to 374° C. N.S. Osborne and C. H. Meyers. J. Research NBS <u>13</u> , 1 (1934). . . . .	RP691	5¢
Heats of combustion and of formation of the normal paraffin hydrocarbons in the gaseous state, and the energies of their atomic linkages. F. D. Rossini. J. Research NBS <u>13</u> , 21 (1934)..	RP692	OP
Fractionation of the isotopes of hydrogen and of oxygen in a commercial electrolyzer. E. U. Washburn, E. R. Smith, and F. A. Smith. J. Research NBS <u>13</u> , 599 (1934).....	RP729	CP
Fractionation of the isotopes of oxygen in a commercial electrolyzer - a correction. E. R. Smith and M. Wojciechowski. J. Research NBS <u>15</u> , 187 (1935) . . . . .	RP820	5¢
Heat of combustion of isobutane. F.D.Rossini. J. Research NBS <u>15</u> , 357 (1935) . . . . .	RP833	5¢
The difference in vapor pressures of ortho- and paradeuterium. F.G.Brickwedde, R.B.Scott, and H.S.Taylor. J. Research NBS <u>15</u> , 463 (1935) ....	RP841	5¢
Empirical relation between the atomic dimensions and the melting and sublimation points of the noble gases, halogens, and elements of the sulphur group. D. H. Brauns. J. Research NBS <u>17</u> , 337 (1936).....	RP915	5¢
Difference in atomic weight of oxygen from air and from water. E. R. Smith and H. Matheson. J. Research NBS <u>17</u> , 625 (1936) . . . . .	RP932	5¢
Heat of hydrogenation of ethylene. F.D.Rossini. J. Research NBS <u>17</u> , 629 (1936) . . . . .	RP933	5¢
Calorimetric determination of the thermodynamic properties of saturated water in both the liquid and gaseous states from 100 to 374° C. N.S.Osborne, H.F.Stimson, and D.C.Ginnings. J. Research NBS <u>18</u> , 389 (1937) . . . . .	RP983	10¢
Molecular volumes and expansivities of liquid normal hydrogen and parahydrogen, R.B.Scott and F.G.Brickwedde. J. Research NBS <u>19</u> , 237 (1937) . . . . .	RP1023	7¢



<u>Title</u>	<u>Series</u>	<u>Price</u>
Calorimetric determination of the heats of combustion of ethylene and propylene. F.D. Rossini and J.W. Knowlton. J. Research NBS <u>19</u> , 249 (1937) .....	RP1024	5¢
Heats of combustion and of formation of the normal olefin (alkene-1) hydrocarbons in the gaseous state. F.D. Rossini and J.W. Knowlton. J. Research NBS <u>19</u> , 339 (1937) .....	RP1028	5¢
Method and apparatus for the rapid conversion of deuterium oxide into deuterium. J.W. Knowlton and F.D. Rossini. J. Research NBS <u>19</u> , 605 (1937) .....	RP1050	5¢
Heat and free energy of formation of carbon dioxide and of the transition between graphite and diamond. F.D. Rossini and R.S. Jessup. J. Research NBS <u>21</u> , 491 (1938) .....	RP1141	5¢
Preparation of oxygen of high purity. Martin Shepherd, E. R. Weaver, and S. F. Pickering. J. Research NBS <u>22</u> , 301 (1939) .....	RP1182	5¢
Heat and free energy of formation of water and carbon monoxide. Frederick D. Rossini. J. Research NBS <u>22</u> , 407 (1939) .....	RP1192	5¢
Distribution of ozone in the stratosphere. W.J. Coblenz and R. Stair. J. Research NBS <u>22</u> , 573 (1939) .....	RP1207	5¢
Thermal properties of saturated water and steam. Nathan S. Osborne, Harold F. Stimson and Defoe C. Ginnings. J. Research NBS <u>23</u> , 261 (1939) .....	RP1229	5¢
Heat and free energy of formation of deuterium oxide. Frederick D. Rossini, John W. Knowlton, and Herrick D. Johnston. J. Research NBS <u>24</u> , 369 (1940) .....	RP1287	5¢
Effect of oxygen and moisture on the stability of leather at elevated temperatures. Joseph R. Kanagy. J. Research NBS <u>25</u> , 149 (1940) .....	RP1319	5¢
Distribution of ozone in the stratosphere: Measurements of 1939 and 1940. W.J. Coblenz and R. Stair. J. Research <u>26</u> , 161 (1941) .....	RP1367	5¢

<u>Title</u>	<u>Series</u>	<u>Price</u>
Hazard of mercury vapor in scientific laboratories. Martin Shepherd and Shuford Schuhmann, and Robert H. Flinn, J. Walter Hough, and Paul A. Neal. J. Research NBS <u>26</u> , 357 (1941) .....	RP1383	10¢
Slopes of pv isotherms of He, Ne, A, H <sub>2</sub> , N <sub>2</sub> , and O <sub>2</sub> at 0° C. Carl S. Cragoe. J. Research NBS <u>26</u> , 495 (1941) .....	RP1393	10¢
Free energies and equilibria of isomerization of the butanes, pentanes, hexanes, and heptanes. Frederick D. Rossini, Edward J. R. Prosen, and Kenneth S. Pitzer. J. Research NBS <u>27</u> , 529 (1941) .....	RP1440	5¢
An equation for the isotherms of pure substances at their critical temperatures. Cyril H. Meyers. J. Research NBS <u>29</u> , 157 (1942) .....	RP1493	10¢
Surface available to nitrogen on bone black and other carbonaceous adsorbents. Victor R. Deitz and Leland F. Gleysteen. J. Research NBS <u>29</u> , 191 (1942) .....	RP1496	10¢
Heat of formation of carbon dioxide and of the transition of graphite into diamond. Edward J. Prosen, Ralph S. Jessup, and Frederick D. Rossini. J. Research NBS <u>33</u> , 447 (1944) .....	RP1620	5¢
Heats of formation and combustion of 1,3-butadiene and styrene. Edward J. Prosen and Frederick D. Rossini. J. Research NBS <u>34</u> , 59 (1945) .....	RP1628	5¢
Heats of combustion of benzene, toluene, ethyl- benzene, o-xylene, m-xylene, p-xylene, n-propylbenzene, and styrene. Edward J. Prosen, Roger Gilmont, and Frederick D. Rossini. J. Research NBS <u>34</u> , 65 (1945). ....	RP1629	5¢
Heats, free energies, and equilibrium constants of some reactions involving C <sub>2</sub> , H <sub>2</sub> , H <sub>2</sub> O, C, CO, CO <sub>2</sub> , and CH <sub>4</sub> . Donald D. Wagman, John E. Kilpatrick, William J. Taylor, Kenneth S. Pitzer, and Freder- ick D. Rossini. J. Research NBS <u>34</u> , 143 (1945). RP1634		10¢

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Scientific Papers

<u>Title</u>	<u>Series</u>	<u>Price</u>
On the establishment of the thermodynamic scale of temperature by means of the constant-pressure gas thermometer. E. Buckingham. Bul. BS <u>3</u> , 237 (1907) .....	S57	OP
The atomic weight of hydrogen. W. A. Noyes. Bul. BS <u>4</u> , 179 (1907) .....	S77	OP
The atomic weight of chlorine. W. A. Noyes and H.C.P. Weber. Bul. BS <u>4</u> , 345 (1907) .....	S81	OP
The theory of the Hampson liquefier. E. Buckingham. Bul. BS <u>6</u> , 125 (1909) .....	S123	OP
On the definition of the ideal gas. E. Buckingham. Bul. BS <u>6</u> , 409 (1909) .....	S136	OP
The latent heat of vaporization of ammonia. N.S. Osborne and M.S. Van Dusen. Bul. BS <u>14</u> , 439 (1918) .....	S315	10¢
Measurements on the index of refraction of air for wave lengths from 2218A to 9000 A. W.F. Meggers and C.G. Peters. Bul. BS <u>14</u> , 697 (1919) .....	S327	10¢
Efflux of gases through small orifices. Edgar Buckingham and J. D. Edwards. Sci. Pap. BS <u>15</u> , 573 (1920) .....	S359	OP
Vapor pressure of ammonia. C.S. Cragoe, C.H. Meyer, and C.S. Taylor. Sci. Pap. BS <u>16</u> , 1 (1920) .....	S369	OP
Composition, purification, and certain constants of ammonia. E.C. McKelvy and C.S. Taylor. Sci. Pap. <u>18</u> , 655 (1923) .....	S465	OP
Specific volume of saturated ammonia vapor. C.S. Cragoe, E.C. McKelvy and G.F.O. Connor. Sci. Pap. <u>18</u> , 707 (1923) .....	S467	OP
Specific heat of superheated ammonia vapor. N.S. Osborne, H.F. Stimson, T.S. Sligh, Jr. and C.S. Cragoe. Sci. Pap. <u>20</u> , 65 (1924) ...	S501	OP
A flow calorimeter for specific heats of gases. N.S. Osborne, H.F. Stimson, and T.S. Sligh, Jr. Sci. Pap. <u>20</u> , 119 (1924) .....	S503	OP
A review of the literature relating to the normal densities of various gases. Marion Smith Blanchard and S.F. Pickering. Sci. Pap. <u>21</u> , 141 (1925) .....	S529	OP

<u>Title</u>	<u>Series</u>	<u>Price</u>
A review of the literature relating to the critical constants of various gases. S.F. Pickering. Sci. Pap. <u>21</u> , 597 (1926).....	S541	OP
<u>Technologic Papers</u>		
A specific gravity balance for gases. J.D. Edwards Tech. Pap. BS T89 (1917) .....	T89	OP
Effusion method of determining gas density. J.D. Edwards. Tech. Pap. BS T94 (1917) .....	T94	OP
<u>Circulars</u>		
Bibliography of scientific literature relating to helium. Cir. BS C81 (1919) .....	C81	OP
Relations between the temperatures, pressures and densities of various gases. Cir. BS C279 (1926)	C279	OP
<u>Miscellaneous Publications</u>		
Compressibilities of gases (1925) .....	M71	OP

Publications in Other Journals

(The following are not Government publications and cannot be obtained from the Superintendent of Documents)

- Determination of gas density. J.D. Edwards. J. Ind. Eng. Chem. (1155 16th St., Washington 6, D.C.) 9, 790 (1917).
- Ferrosilicon process for the generation of hydrogen. E.R. Weaver. Report No. 40. Fourth annual report of the National Advisory Committee for Aeronautics, 1918. (Available from National Bureau of Standards.)
- Preparation and testing of hydrogen of high purity. J.D. Edwards. J. Ind. Eng. Chem. 11, 961 (1919).
- Inflammability of jets of hydrogen and inert gas. P.G. Ledig. J. Ind. Eng. Chem. 12, 1098 (1920).
- An airship slide rule. E. R. Weaver and S.F. Pickering. Report No. 160. Ninth annual report of National Advisory Committee for Aeronautics. (1923).
- Production of hydrogen by the thermal decomposition of oil. E. R. Weaver. Chem. Met. Eng. 28, 764, 939, 1072 (1923).



Description of new type of gas density balance. S.F. Pickering.  
Oil and Gas J. 28, Dec. 26, 1929.

The composition of the atmosphere at approximately 21.5 kilometers. Martin Shepherd. The National Geog. Soc.-U.S. Army Air Corps Stratosphere Flight of 1935 in the Balloon "Explorer II." (Natl. Geo. Soc., Washington, D.C.) Stratosphere Series No. 2.

## II. GAS ANALYSIS

### Research Papers

<u>Title</u>	<u>Series</u>	<u>Price</u>
A study of hydrogen-antimony-tin method for determination of oxygen in cast irons. Bengt Kjerman and Louis Jordan. BS J. Research <u>1</u> , 701 (1928) .....	RP25	OP
The accurate determination of the gasoline content of natural gas and the analytical separation of natural gases by isothermal fractional distillation. Martin Shepherd, BS J. Research <u>2</u> , 1145 (1929). ....	RP75	10¢
A simple control stopcock for gas analysis apparatus. Martin Shepherd. BS J. Research <u>4</u> , 23 (1930) .....	RP130	OP
A gas analysis pipette for difficult absorptions. Martin Shepherd, BS J. Research <u>4</u> , 747 (1930) .....	RP177	OP
An improved apparatus and method for the analysis of gas mixtures by combustion and absorption. Martin Shepherd, BS J. Research <u>6</u> , 121 (1931) .....	RP266	OP
Determination of oxygen and nitrogen in irons and steels by vacuum fusion methods. H.C. Vacher and L. Jordan, BS J. Research <u>7</u> , 375 (1931) .....	RP346	10¢
Gases obtained from commercial feldspars heated in vacuo. G. R. Shelton and H.H. Holscher. BS J. Research <u>8</u> , 347 (1932) .....	RP420	OP
Nitrogen content of some standard-sample steels. J.G. Thompson and E.H. Hamilton. BS J. Research <u>2</u> , 593 (1932) .....	RP494	5¢
Critical study of the determination of ethane by combustion over platinum in the presence of excess oxygen. Martin Shepherd and Joseph R. Branham, BS J. Research <u>11</u> , 783 (1933), .....	RP625	5¢

<u>Title</u>	<u>Series</u>	<u>Price</u>
Errors in gas analysis arising from loss of gas by solution in rubber connections and stopcock lubricant. J. R. Branham. BS J. Research <u>12</u> , 353 (1934) .....	RP661	CP
Significant vapor pressure considerations of the Van Slyke manometric method of gas analysis. Martin Shepherd. BS J. Research <u>12</u> , 551 (1934) .....	RP680	5¢
Critical study of the determination of ethane by explosion with oxygen or air. J.R.Branham and Martin Shepherd. J. Research NBS <u>13</u> , 377 (1934) .....	RP715	5¢
Saturation by water in gas analysis compensators. J.R.Branham. J. Research NBS <u>18</u> , 59 (1937) ...	RP962	5¢
Cooperative study of methods for the determination of oxygen in steel. J.G.Thompson, H.C.Vacher and H.A.Bright. J. Research NBS <u>18</u> , 259 (1937) .....	RP976	10¢
Gases in some optical and other glasses. C.Hahner, G.G.Voigt and A.N.Finn. J. Research NBS <u>19</u> , 95 (1937) .....	RP1014	5¢
Preparation and application of chromous solutions for the absorption of oxygen in volumetric gas analysis. J.R.Branham. J. Research NBS <u>21</u> , 45 (1938) .....	RP1112	5¢
Displacement of nitrogen from and its solution in certain reagents during volumetric gas analysis. J.R.Branham and Max Sucher. J. Research NBS <u>21</u> , 63 (1938) .....	RP1113	5¢
Hydrogen-reduction method for the determination of oxygen in steel. J.G.Thompson and V.C.F. Holm. J. Research NBS <u>21</u> , 79 (1938) .....	RP1114	5¢
Determination of oxygen in alloy steels. J.G. Thompson and V.C.F.Holm. J. Research NBS <u>21</u> , 87 (1938) .....	RP1115	10¢
Gasometric method and apparatus for the analysis of mixtures of ethylene oxide and carbon dioxide. J.R.Branham and Martin Shepherd. J. Research NBS <u>22</u> , 171 (1939) .....	RP1175	10¢

<u>Title</u>	<u>Series</u>	<u>Price</u>
Bubbler tip of Pyrex glass for difficult absorp- tions. Joseph R. Branham and Edward O. Sper- ling. J. Research NBS <u>22</u> , 701 (1939) .....	RP1214	5¢
Analytical separation and purification of gases by fractional distillation and rectification at low temperatures. Martin Shepherd. J. Research NBS <u>26</u> , 227 (1941) .....	RP1372	10¢
Determination of hydrogen in ferrous materials by vacuum extraction at 800° C and by vacuum fusion. Vernon C. F. Holm and John J. Thomp- son. J. Research NBS <u>26</u> , 245 (1941) .....	RP1373	5¢
A manometric gas analysis apparatus. Martin Shepherd and E. O. Sperling. J. Research NBS <u>26</u> , 341 (1941) .....	RP1380	5¢
An apparatus for the absorption or gravimetric determination of constituents of a gas mixture. Martin Shepherd and Harry W. Bailey. J. Re- search NBS <u>26</u> , 347 (1941) .....	RP1381	OP
Modifications of apparatus for volumetric gas analysis. Martin Shepherd. J. Research NBS <u>26</u> , 351 (1941) .....	RP1382	5¢
Critical study of the determination of carbon monoxide by combustion over platinum in the presence of excess oxygen. Joseph R. Branham, Martin Shepherd and Shuford Schuhmann. J. Research NBS <u>26</u> , 571 (1941) .....	RP1396	5¢
Separation of hydrocarbons by azeotropic distil- lation. Beveridge J. Mair, Augustus R. Glasgow, Jr., and Frederick D. Rossini. J. Research NBS <u>27</u> , 39 (1941) .....	RP1402	OP
Note on the macroanalysis of carbon and hydrogen by combustion. Donald D. Wagman and Frederick D. Rossini. J. Research NBS <u>32</u> , 95 (1944) ....	RP1577	5¢
Revised results obtained with certain dehydrating agents used for drying gases. John H. Bower. J. Research NBS <u>33</u> , 199 (1944) .....	RP1603	5¢

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Scientific Papers

<u>Title</u>	<u>Series</u>	<u>Price</u>
Colorimetric determination of acetylene and its application to the determination of water. E. R. Weaver. Bul. BS <u>13</u> , 27 (1916) .....	\$267	OP
Gas interferometer calibration. J.D. Edwards. Bul. BS <u>14</u> , 473 (1918) .....	\$316	5¢
New forms of instruments for showing the presence and amount of combustible gas in the air. E.R. Weaver and E. E. Weibel. Sci. Pap. BS <u>15</u> , 47 (1919) .....	\$334	OP
Equilibrium conditions in the system carbon, iron oxide, and hydrogen in relation to the Ledebur method for determining oxygen in steel. J.R. Cain and L. Adler. Sci. Pap. BS <u>15</u> , 353 (1919) .....	\$350	OP
Determination of sulphur trioxide in presence of sulphur dioxide, together with some analyses of commercial liquid sulphur dioxide. J.R. Eckman. Sci. Pap. BS <u>22</u> , 277 (1927) .....	\$554	5¢
A weight burette for the micromasurement of liquid volumes. Martin Shepherd. Sci. Pap. BS <u>22</u> , 287 (1927) .....	\$555	5¢
A burette for the accurate measurement of gas volumes without gas connection to a compensator. E. R. Weaver and Martin Shepherd. Sci. Pap. BS <u>22</u> , 375 (1927) .....	\$559	OP

Technologic Papers

Determination of sulphur in illuminating gas. R.S. McBride and E.R. Weaver. Tech. Pap. BS T20 (1913) .....	T20	OP
The determination of ammonia in illuminating gas. J.D. Edwards. Tech. Pap. BS T34 (1914) .....	T34	OP
Lead acetate test for hydrogen sulphide in gas. J.D. Edwards. Tech. Pap. BS T41 (1914) .....	T41	OP
A study of the Goutal method for determining carbon monoxide and carbon dioxide in steels. J.R. Cain and E. Pettijohn. Tech. Pap. BS T126 (1919) .....	T126	OP



<u>Title</u>	<u>Series</u>	<u>Price</u>
Application of the interferometer to gas analysis. J.D. Edwards. Tech. Pap. BS T131 (1919) .....	T131	OP
Detector for water vapor in closed pipes. E.R. Weaver and P.G. Ledig. Tech. Pap. BS <u>17</u> , 637 (1923) .....	T242	OP
Thermal-conductivity method for the analysis of gases. P.E. Palmer and E.R. Weaver. Tech. Pap. BS <u>18</u> , 35 (1924) .....	T249	OP

### Circulars

Glass Stopcocks. Cir. NBS C430 (1941) ..... C430 10¢

### Publications in Other Journals

(The following are not Government publications and can not be obtained from the Superintendent of Documents.)

A qualitative test for water by the use of the acetylene-cuprous chloride reaction. E.R. Weaver. J. Am. Chem. Soc. (Mills Bldg., Washington, D.C.) 36 (2) 2462 (1914).

Gas washing apparatus with inclosed filter. E.R. Weaver and J.D. Edwards. J. Ind. Eng. Chem., 1155 16th St., Washington 6. D.C.) 7, 534 (1915).

Testing of balloon gas. J.D. Edwards. Report No. 41. Fourth Annual Report of Nat'l. Advisory Comm. for Aeronautics. 1918.

A weight buret for gas analysis. E.R. Weaver and P.G. Ledig. J. Am. Chem. Soc. 42, 1177 (1920).

New forms of combustion apparatus for use in gas analysis. E.R. Weaver and P.G. Ledig. J. Ind. Eng. Chem. 12, 368 (1920).

Gas purity recorder for electrolytic oxygen and hydrogen. P.E. Palmer and C.P. Larrabee. Bulletin of Compressed Gas Manufacturers' Association (11 W. 42nd St., New York, N.Y. ) (1921).

Absorption of carbon dioxide and ammonia from gas bubbles. P.G. Ledig. Ind. and Eng. Chem. 16, 1231 (1924).

Method for studying the rapid absorption of gases by liquids. P.G. Ledig and E.R. Weaver. J. Am. Chem. Soc. 46, 650 (1924).

- An adaptation of the thermal conductivity method to the analysis of respiratory gases. P.G.Ledig and R.S.Lyman. J.Clinical Investigation 4, 495 (1927).
- Rubber stopcock lubricants for high vacuum and other uses. Martin Shepherd and P.G.Ledig. Ind.Eng.Chem. 19, 1059 (1927).
- An automatic sample collecting vacuum pump. E.R.Weaver and Martin Shepherd. Am.Chem.Soc. 50, 1829 (1928).
- Iodine-pentoxide method for analyzing products of combustion for small quantities of carbon monoxide. Gas Chemists Handbook (American Gas Association, 420 Lexington Ave., New York, N. Y.) 3d Ed. p. 289 (1929).
- Application of the thermal-conductivity method of gas analysis to the study of gas appliances. Gas Chemists Handbook 3d Ed. p. 297 (1929).
- Common errors of gas analysis and their remedies. Martin Shepherd. Am. Gas J. (53 Park Pl. New York, N. Y.) 134, 49 and 67 (1931).
- Calculating gas heating value from analysis. J.R.Branham. Am.Gas J. 135, 42 (1931).
- Device for removing "frozen" plugs from stopcocks. Harry W. Bailey. Ind.Eng.Chem. Anal. Ed. 4, 324 (1932).

### III. UTILIZATION OF FUEL GASES -

#### GAS APPLIANCES - FLAME STUDIES Research Papers

<u>Title</u>	<u>Series</u>	<u>Price</u>
Bunsen flames of unusual structure. F.A.Smith and S.F.Pickering. BS J. Research <u>3</u> , 65 (1929)	RP84	OP
A method for determining the most favorable design of gas burners. BS J. Research <u>8</u> , 669 (1932). J. H. Eiseman, E.R.Weaver, and F.A.Smith .....	RP446	OP
The Thomas recording gas calorimeter. R.S.Jessup. BS J. Research <u>10</u> , 99 (1933) .....	RP519	OP
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IV. MEASUREMENT OF GASES  
(See also Gas Analysis)

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A flow manostat for various purposes, including the candy test. Max J. Proffitt. J. Research NBS <u>29</u> , 142 (1942) .....	RP1492	10¢

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P.G. Ledig. Aviation (330 W. 42nd St., New York, N.Y.)  
Apr. 15, 1919, p. 325.

VI. MISCELLANEOUS

<u>Title</u>	<u>Series</u>	<u>Price</u>
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Removal of dissolved gases from liquids by vacuum sublimation. J.H.Hibben. BS J. Research <u>3</u> , 97 (1929) .....	RP87	5¢
Method for determining uniformity of temperature in cryostats. Martin Shepherd. J. Research NBS <u>21</u> , 831 (1938) .....	RP1158	5¢
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